



Transit Agency Pioneers Electric Bus Program with Positive Results



Taking the lead

When San Joaquin Regional Transit District (RTD) decided to pilot electric buses in 2013, there were few preexisting examples within the state to rely on for best practices. As the first transit agency in Northern California to employ a 100% battery-electric bus into service, RTD broke the mold on cleantech public transit.

Fast forward to 2016, the agency took another big leap by creating the nation's first all-electric bus rapid transit route, with a vision to electrify 100% of its fleet operating within Stockton by 2025.

San Joaquin RTD project at a glance

- Located in Stockton, Calif.
- Serves 1,400 square mile territory
- 17 Proterra electric buses
- 5 plug-in depot chargers
- 4 overhead in-route chargers
- Buses run approx. 319,000 mi. annually
- Goal of full electric fleet by 2025

Background

According to the California Air Resources Board (CARB), the transportation sector accounted for the largest portion of total statewide greenhouse gas (GHG) emissions in 2018 (40%), with the heavy-duty vehicle sector accounting for 21% of those emissions.¹

CARB's Innovative Clean Transit (ICT) mandate, which calls for all transit buses to be zero emission by 2040, has empowered transit fleets' efforts to increasingly purchase electric buses. Beginning in 2029, all new purchases by transit agencies must be zero-emission buses, including agencies that own, operate, or lease buses with a gross vehicle weight rating greater than 14,000 lbs. With a combination of state and local grants, as well as partnerships with utilities like PG&E, these fleets can make this transition quicker, smoother, and more affordable.

Setting the right goals

When it came to expanding the charging infrastructure to meet the needs of both the older and newer generation buses, RTD worked with PG&E to determine the best design setup. The agency set out to build infrastructure that will optimize charging schedules while reducing maintenance and fuel costs to help the fleet achieve a lower total cost of ownership for the electric buses.

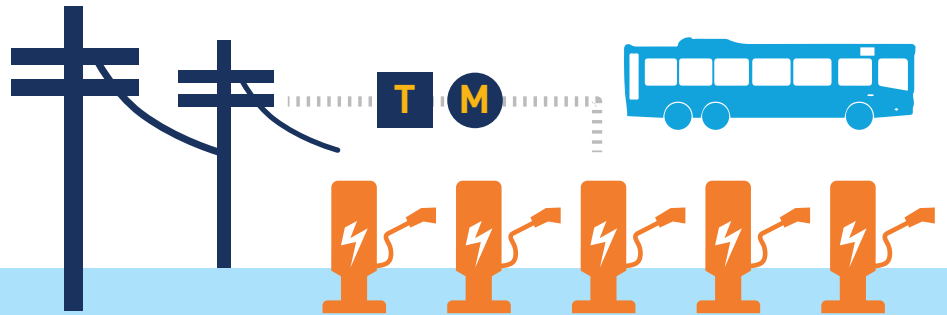
A solution with varying infrastructure came out of necessity, since the first generation of electric buses have shorter ranges of approximately 30-50 miles, requiring frequent, on-route charging at high power levels. While the newer Proterra buses have ranges closer to 130 miles, allowing for overnight charging at lower power levels.

Testing charging infrastructure

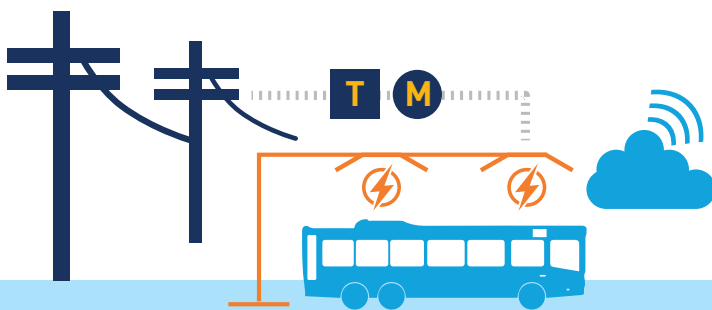
With the support of PG&E, the transit agency tested the combination of both depot and overhead charging at three separate depot locations.

Regional Transit Center

The Regional Transit Center has five 60 kW depot chargers that charge five long-range buses overnight.

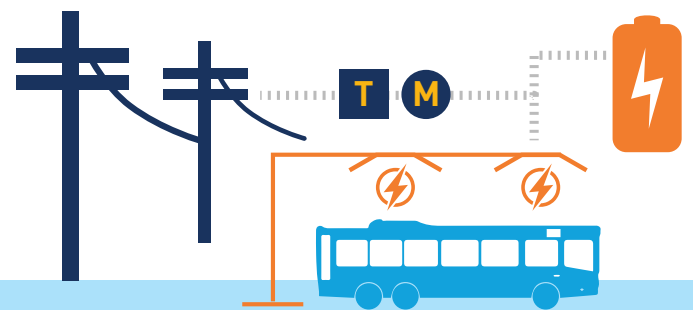


Downtown Transit Center



The Downtown Transit Center is the largest transit hub in Stockton, with two overhead chargers that serve buses operating on four short routes. Charge management software was deployed during the pilot to address high demand costs and determine whether managed charging will reduce electricity bills while still serving the operational needs for electric buses on these routes.

Union Transfer Station



The Union Transfer Station is equipped with two overhead fast chargers that serve two of RTD's key rapid transit routes. RTD plans to add a battery-electric storage system to this location to test how energy storage can reduce operational costs, particularly following the transition to PG&E's Business EV rate plans.

New EV rates increase savings

In addition to the cost savings realized through infrastructure design, enrolling in PG&E’s new Business EV (BEV) rate plan helped reduce the cost of electricity for the transit agency – making the overall total cost of ownership of the electric fleet more viable.

The BEV rate plans offer two subscription rates, which combine a monthly subscription charge based on energy usage and a time-of-use rate. PG&E helped the transit agency determine the best rate plan based on their energy load and charging schedules to keep fuel costs low.

In the first month enrolled with the BEV rate plans, RTD saw cost savings totaling nearly \$15,000 at the three different stations combined. Overall, the fleet reduced its fuel cost per mile from \$2.31 to \$0.68 with the BEV rate plans. It is important to note that operations in 2020 were limited due to the COVID-19 pandemic, so the scale of savings during full operation may change.



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Site	Billing Details	June Bill A10 rate	July Bill BEV rate	Savings
RTC	5 Depot Chargers; No time-of-use charges	\$3,181	\$1,001	\$2,181
DTC	2 Overhead Chargers; Demand Management Software in Place	\$8,334	\$1,707	\$6,627
UTS	2 Overhead Chargers; No Demand Management Software	\$9,437	\$3,423	\$6,014
Fleet cost per mile		\$2.31	\$0.68	\$1.63

Lessons learned to improve ongoing electrification

Throughout the project, RTD encountered a few challenges unique to their site setup and to deploying electric transit buses. By learning how to address these obstacles, RTD helped advance the sector’s knowledge for electric bus deployments that could be useful for other transit fleets.

One challenge RTD experienced is with the real-world efficiency of using demand management software (DMS). While DMS did prove to be highly effective at controlling costs by capping average demand in a 15-minute window, the software was not advanced enough to override in real-time or to prioritize buses with low power. This may confuse drivers and dispatchers while determining when and where to charge the buses. RTD, and other large fleets, could benefit from a solution that automatically manages and prioritizes charging demand.

Also, the process of deploying energy storage at the Union Transfer Station, which is a relatively new application, may be more complex than expected due to uncertainty about installation requirements, and the cost of equipment and labor. RTD also experienced issues with construction permitting, maintenance of older electric buses, and range limitations for longer routes, which transit fleets with older buses may need to work around as well.

While they did encounter some obstacles, overall, the agency’s experience has shown that transit fleets can benefit from electric buses due to the vehicle’s high utilization rates, fixed routes, and return-to-base at night operations.

Partnerships are critical to success

In addition to working with PG&E to determine the charging infrastructure setup, collaborating with the bus manufacturer proved to further RTD's understanding of electrification. Direct access to Proterra's online portal with electric bus and charger operational data accelerated the data collection process and subsequent analysis. This information gave RTD transparency into its processes and helped the team to react quickly to operational changes.

While working with a mix of older and newer models, and mixed charging infrastructure setup does require more coordination for the transit agency, they are realizing significant cost-savings with the guidance and support provided by the EV Fleet program. Early enrollment in the BEV rate plan helped see decreased energy costs that will contribute to reduced total cost of ownership over the lifetime of the electric buses.

Early partnership between PG&E and transit agency customers provides an opportunity for the transfer of knowledge and best practices. The EV Fleet team brings unique insights and can support agencies with expertise developed through implementing programs and projects throughout Northern and Central California.



Resources

California GHG Emissions

¹ California Greenhouse Gas Emissions for 2000 to 2018, California Air Resources Board:
https://www3.arb.ca.gov/cc/inventory/pubs/reports/2000_2018/ghg_inventory_trends_00-18.pdf

Webinar: How RTD Saved on Fuel Costs with PG&E's Business EV rates

<https://www.act-news.com/webinar/save-with-pge-ev-business-rates/>

Article: Making Electrification More Cost-Effective for Fleets

<https://www.act-news.com/news/save-on-energy-costs-with-pges-business-ev-rates/>

EV Fleet program overview and available incentives

https://www.pge.com/pge_global/common/pdfs/solar-and-vehicles/your-options/clean-vehicles/charging-stations/ev-fleet-program/transit-ev-fleet-program-overview.pdf

Summary of available funding for transit fleets

https://www.pge.com/pge_global/common/pdfs/solar-and-vehicles/your-options/clean-vehicles/charging-stations/ev-fleet-program/transit-summary-of-incentives.pdf

Transit EV Fleet resources

https://www.pge.com/en_US/large-business/solar-and-vehicles/clean-vehicles/ev-fleet-program/transit-fleets.page



Drive change with EVs, connect with an EV Fleet specialist to learn how.
Submit an interest form at pge.com/evfleet

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